Exoplanet Exploration with the WFIRST Coronagraph Instrument

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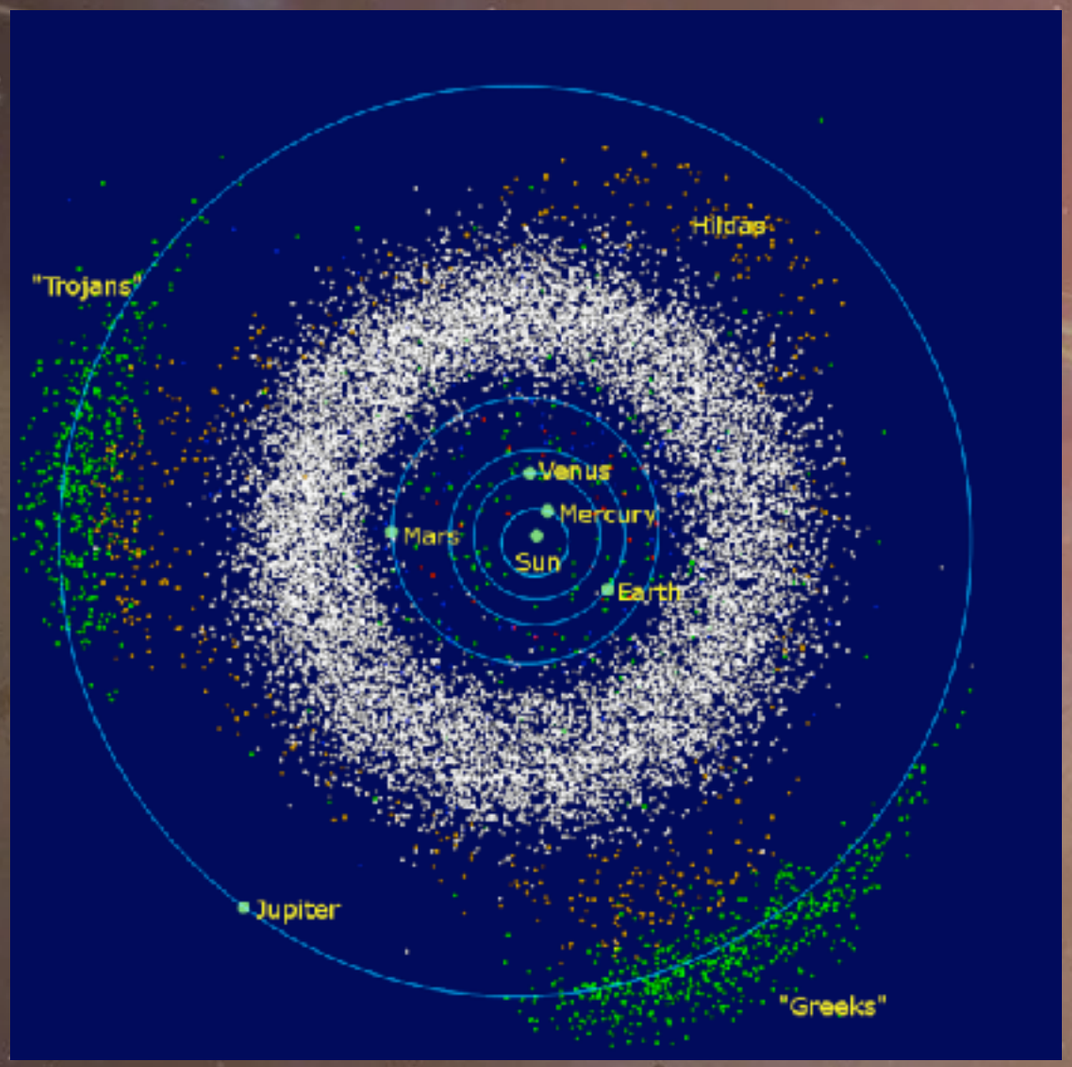
Jet Propulsion Laboratory
California Institute of Technology

Meeting of the AAS
NASA Hyperwall
Washington DC – 11 January 2018

The decision to implement the WFIRST mission will not be finalized until NASA completes the National Environmental Policy Act (NEPA) process. This document is being made available for information purposes only.

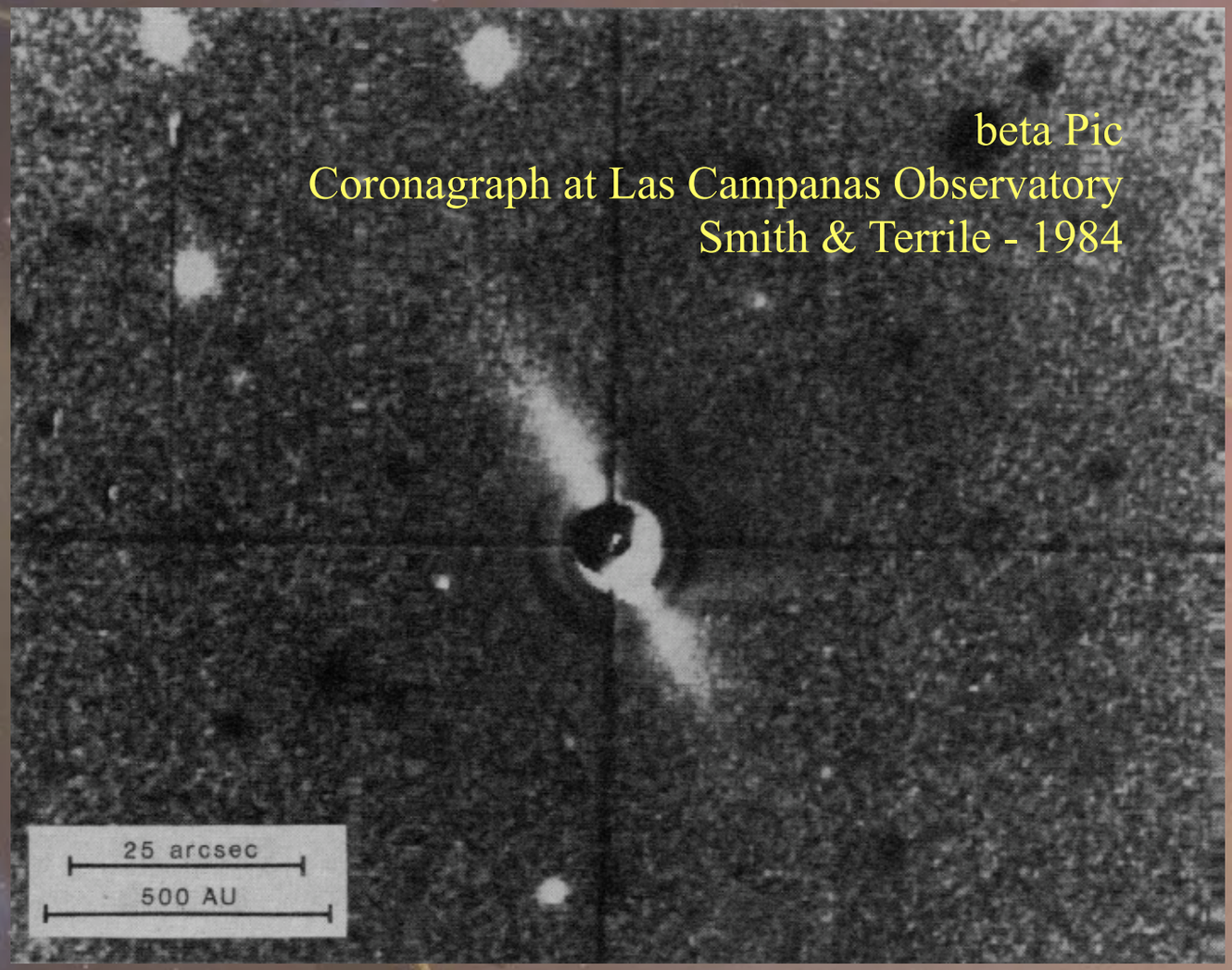
CGI objective is the direct imaging of exoplanet systems

Our Solar System contains thousands of objects.



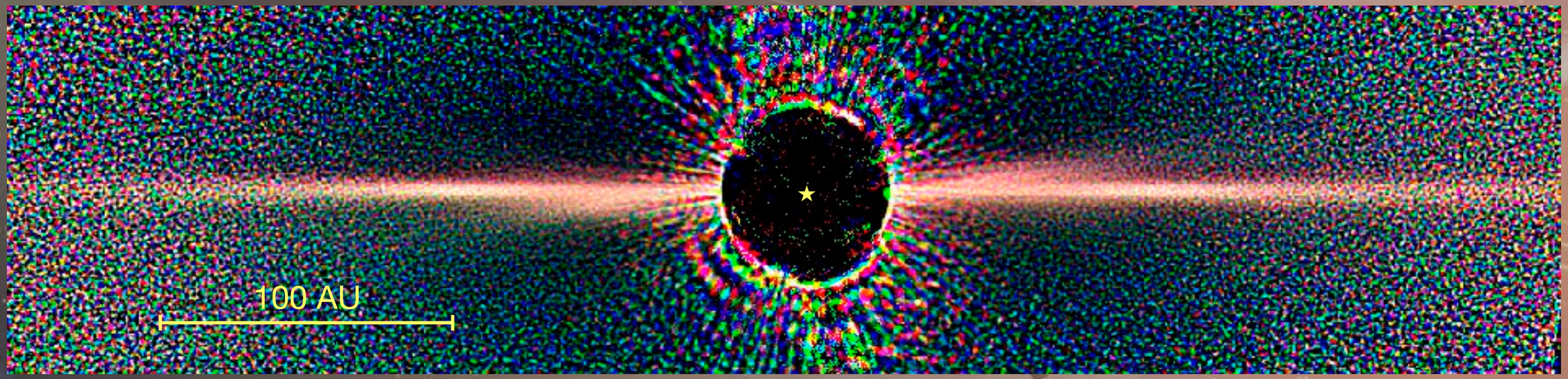
Direct imaging reveals planets, dust/debris structures and, ultimately, spectra of exoplanet systems.

CGI objective is the direct imaging of exoplanet systems



Direct imaging to date has been limited to dust/debris disks and young self-luminous planets

CGI objective is the direct imaging of exoplanet systems



beta Pic
HST/ACS Aberrated Beam Coronagraph
Golimowski et al. 2006

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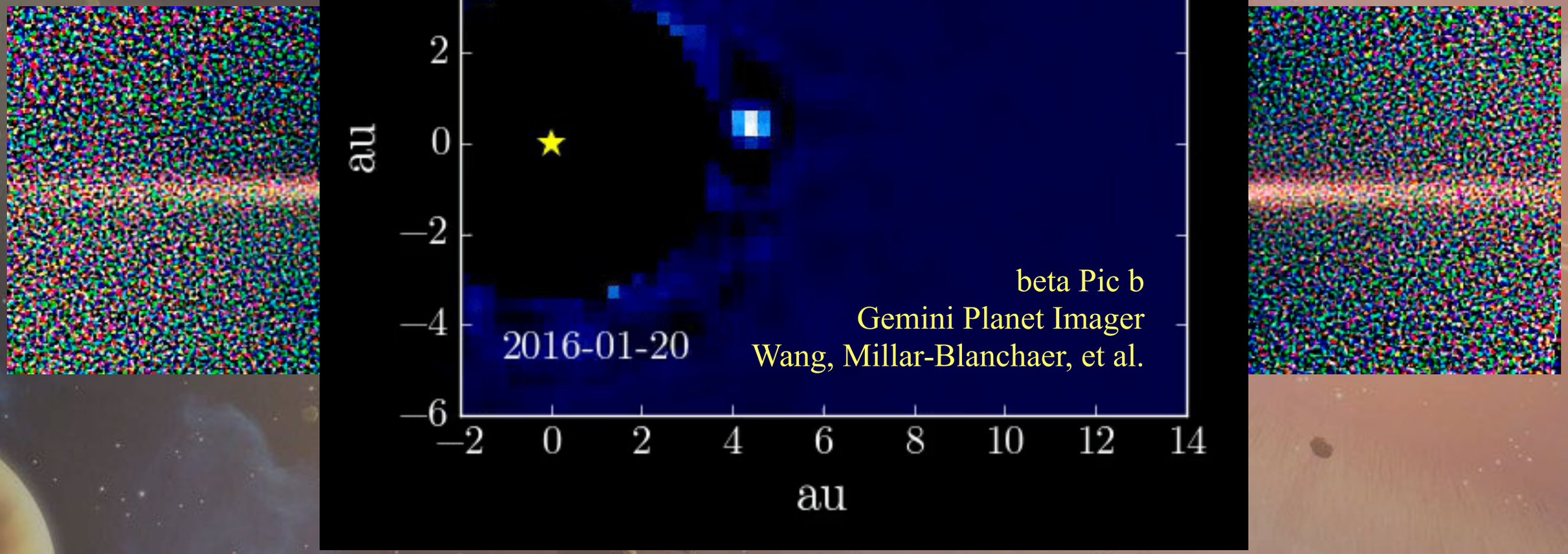

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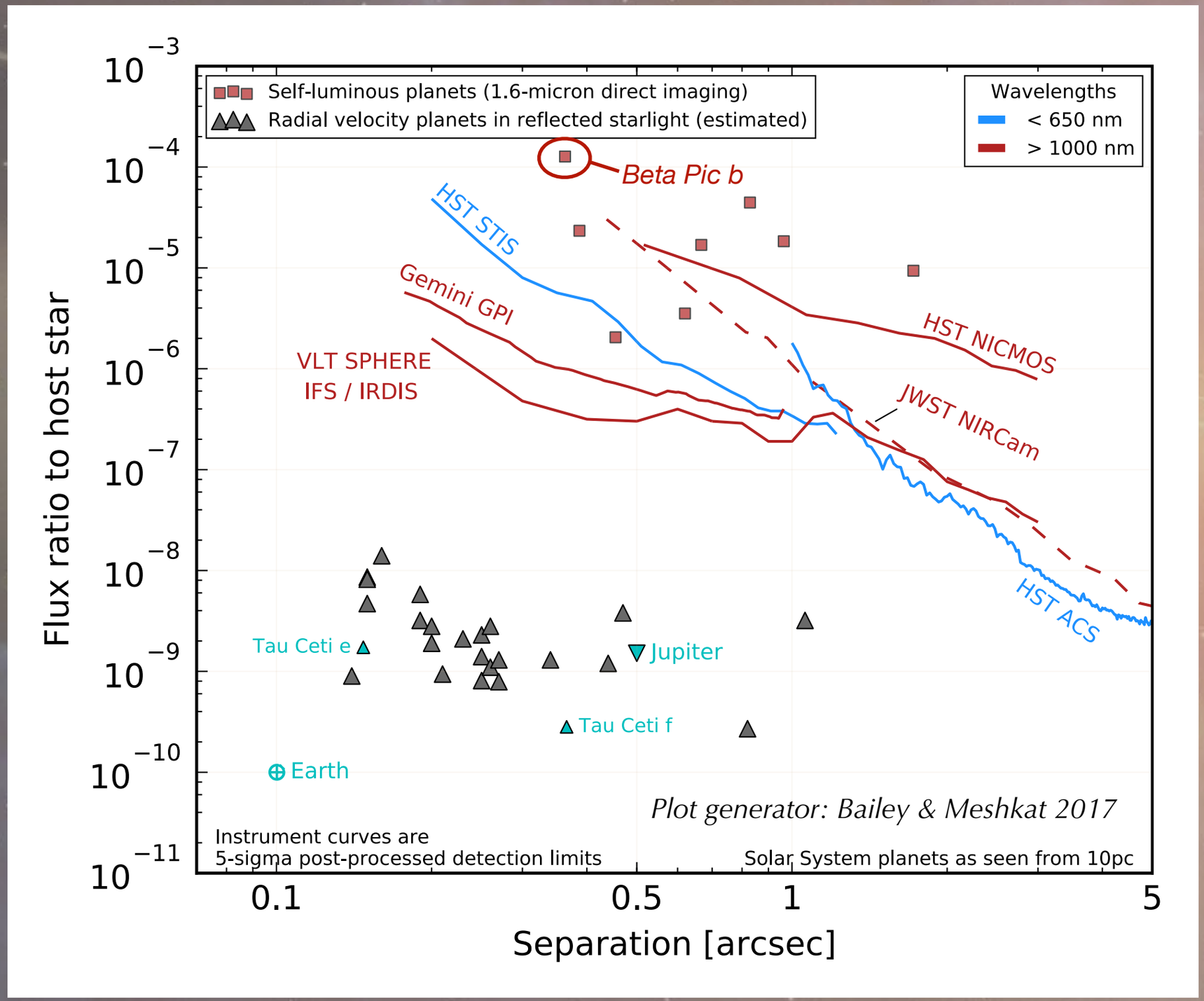
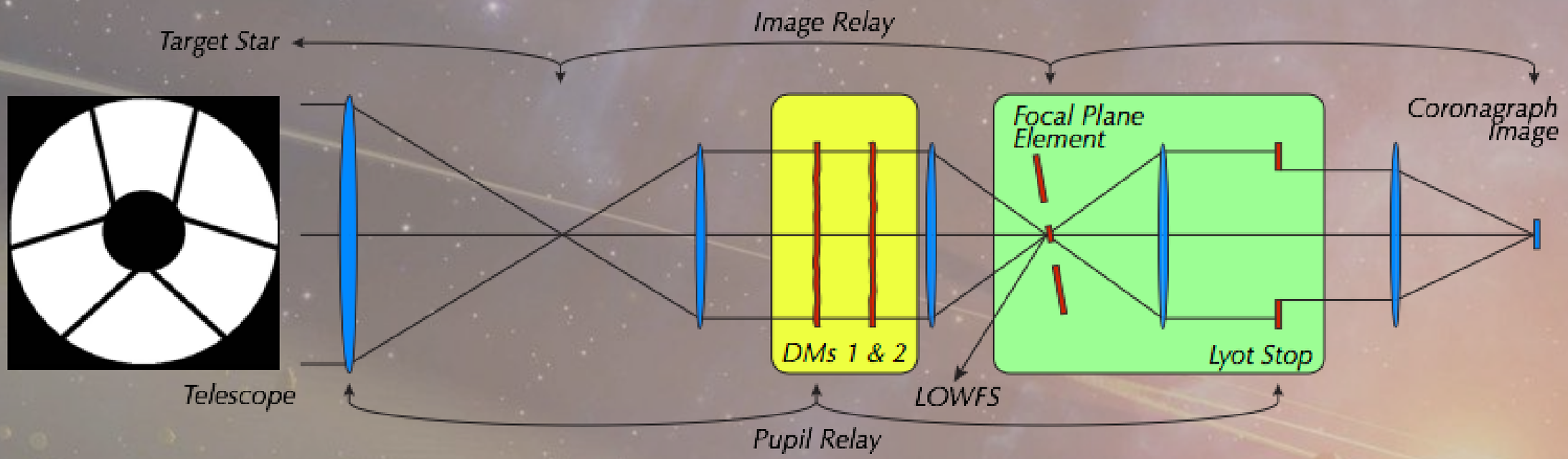
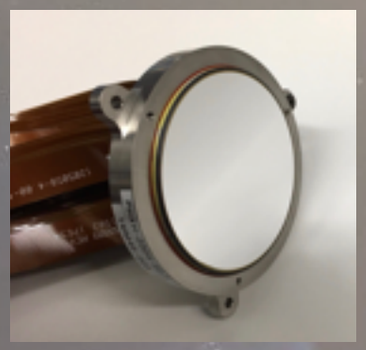
Direct Imaging of Exoplanets: 2017

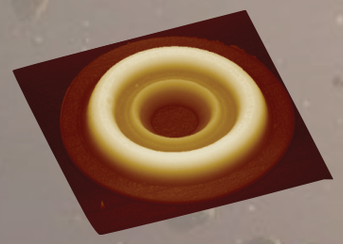


CGI is an actively corrected coronagraph

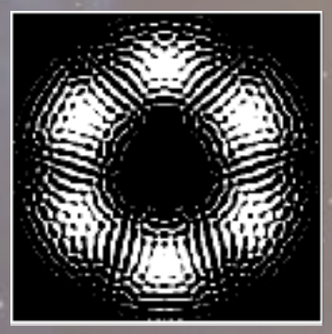


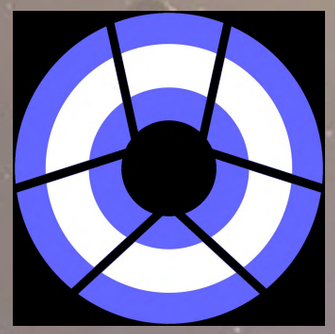


A pair of deformable mirrors

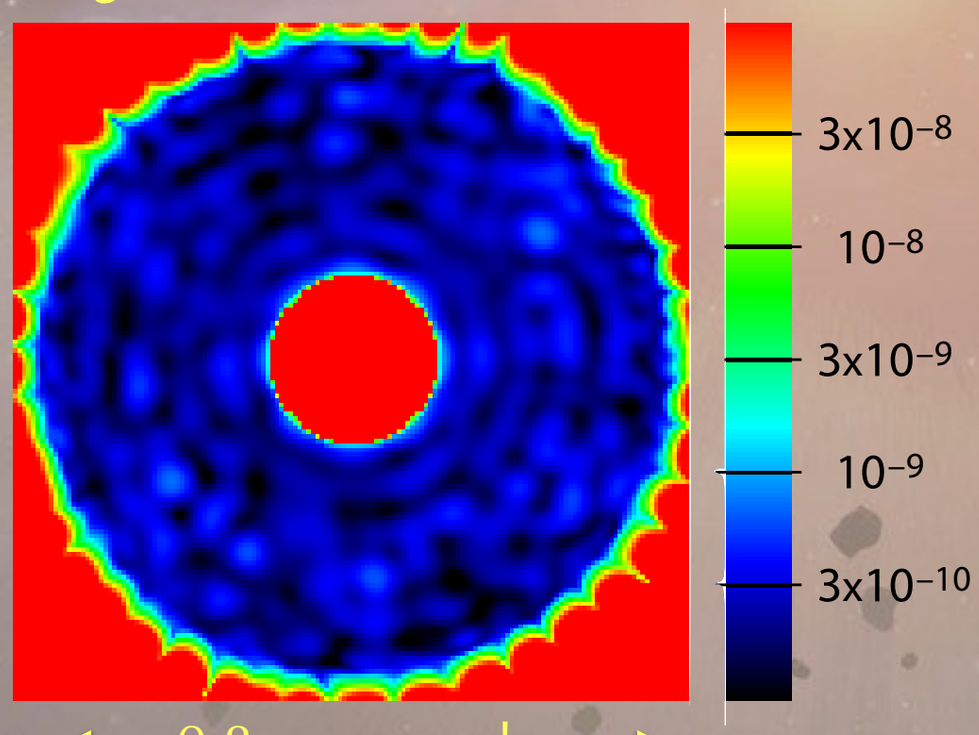


Selectable focal plane and pupil plane masks



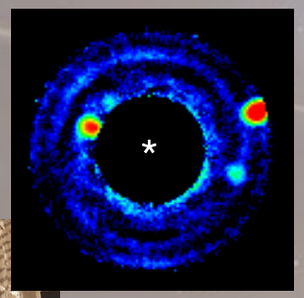


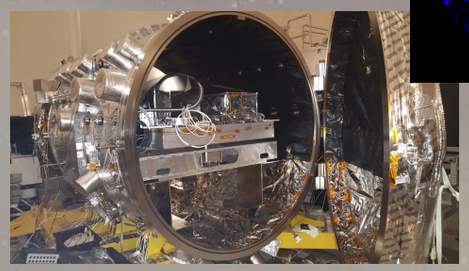
High-contrast field of view



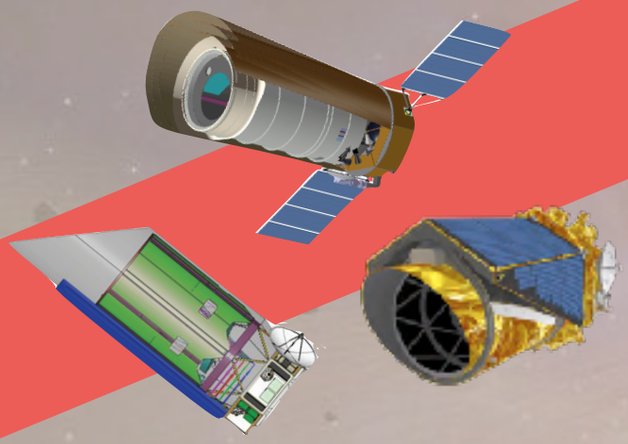
CGI inherits the past decade of coronagraph developments and investigations

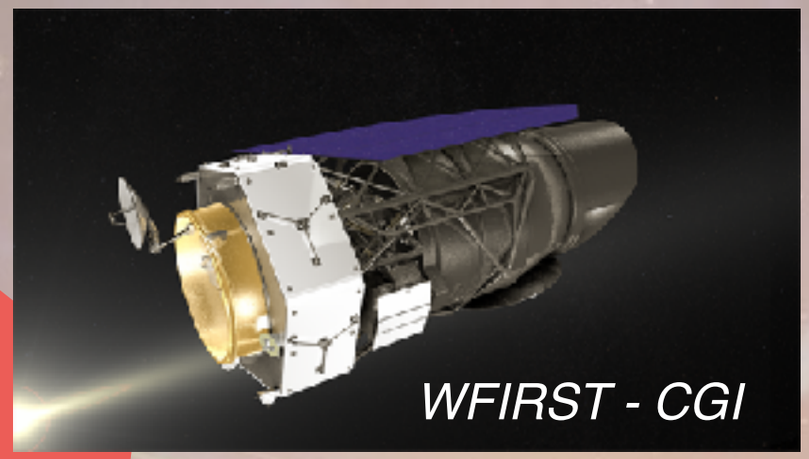
High Contrast Laboratory Demonstrations





NASA / ASMCS Probe-class Concept Studies



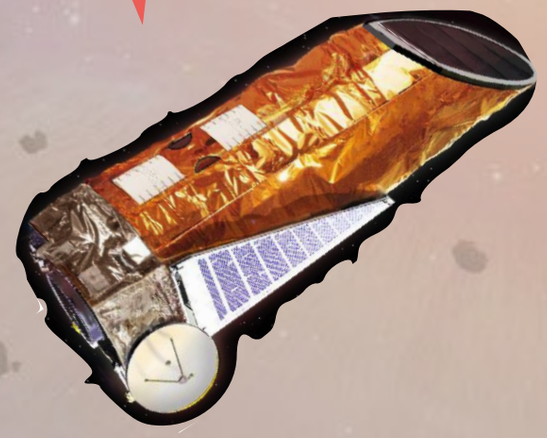


Ground-based AO Coronagraphs

Gemini Planet Imager

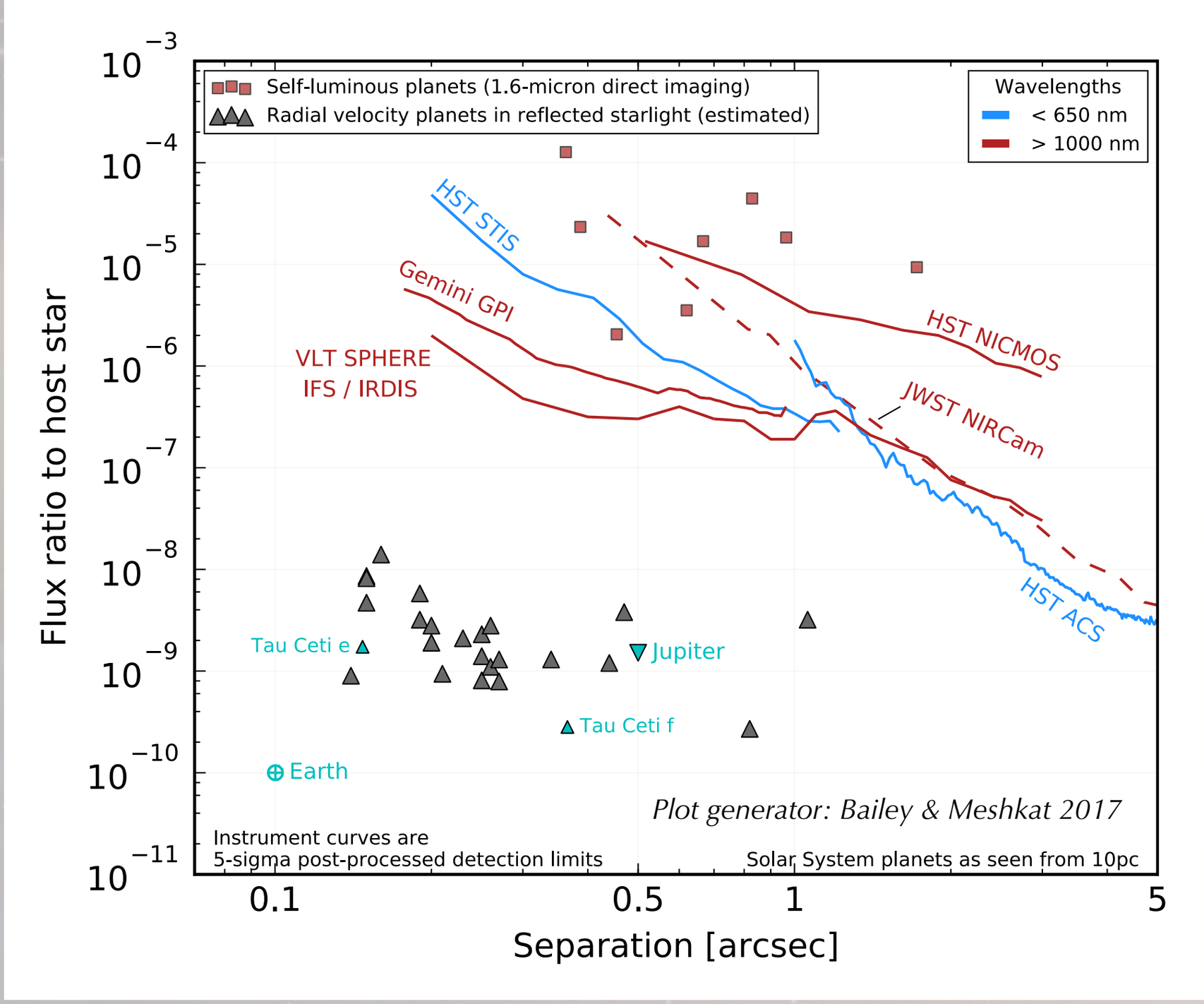
SPHERE
Spectro-Polarimetric High-contrast Exoplanet REsearch

SCExAO



Exo-C Mission Concept

WFIRST Coronagraph Instrument benefits from the stability of a Space Observatory



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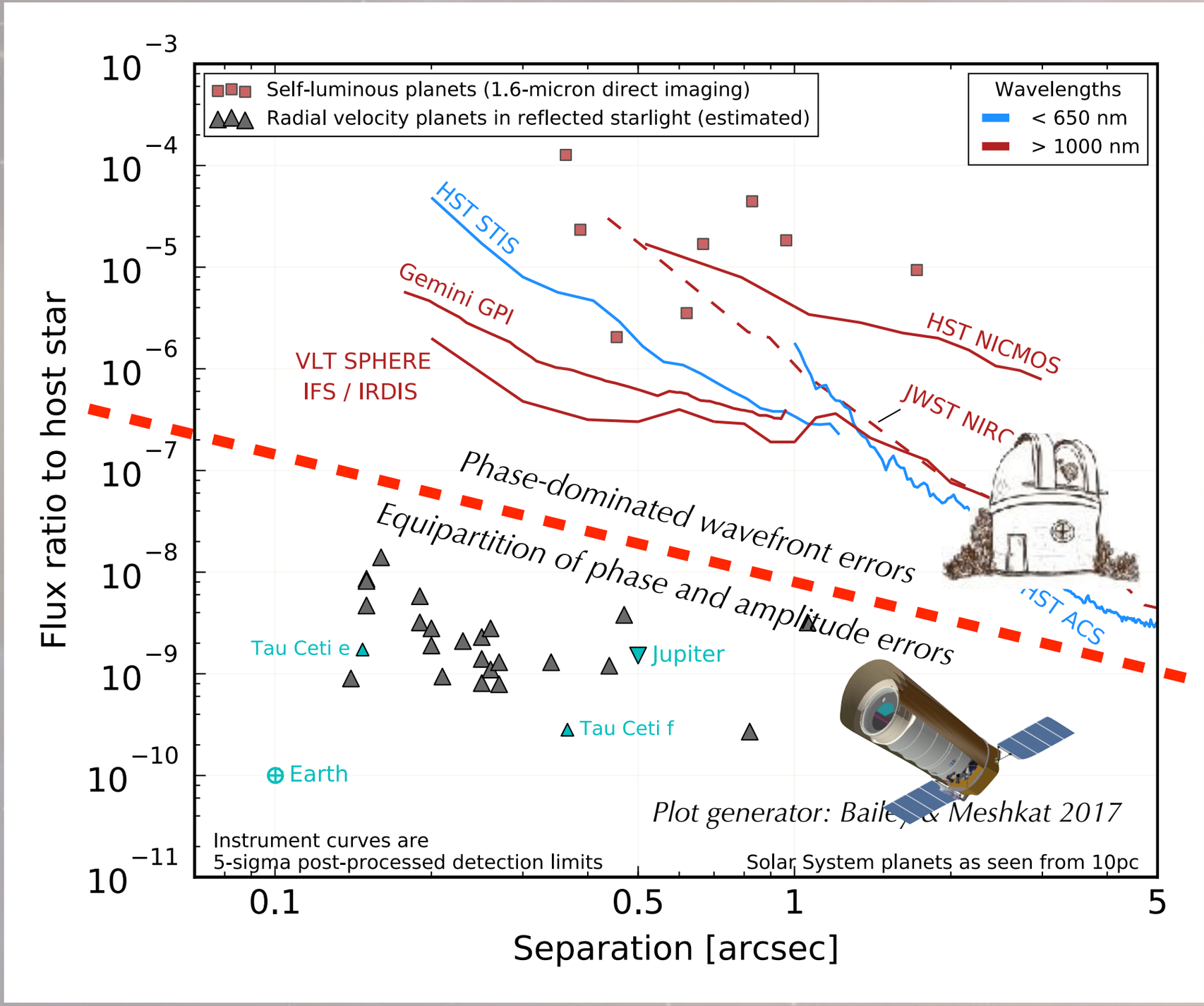

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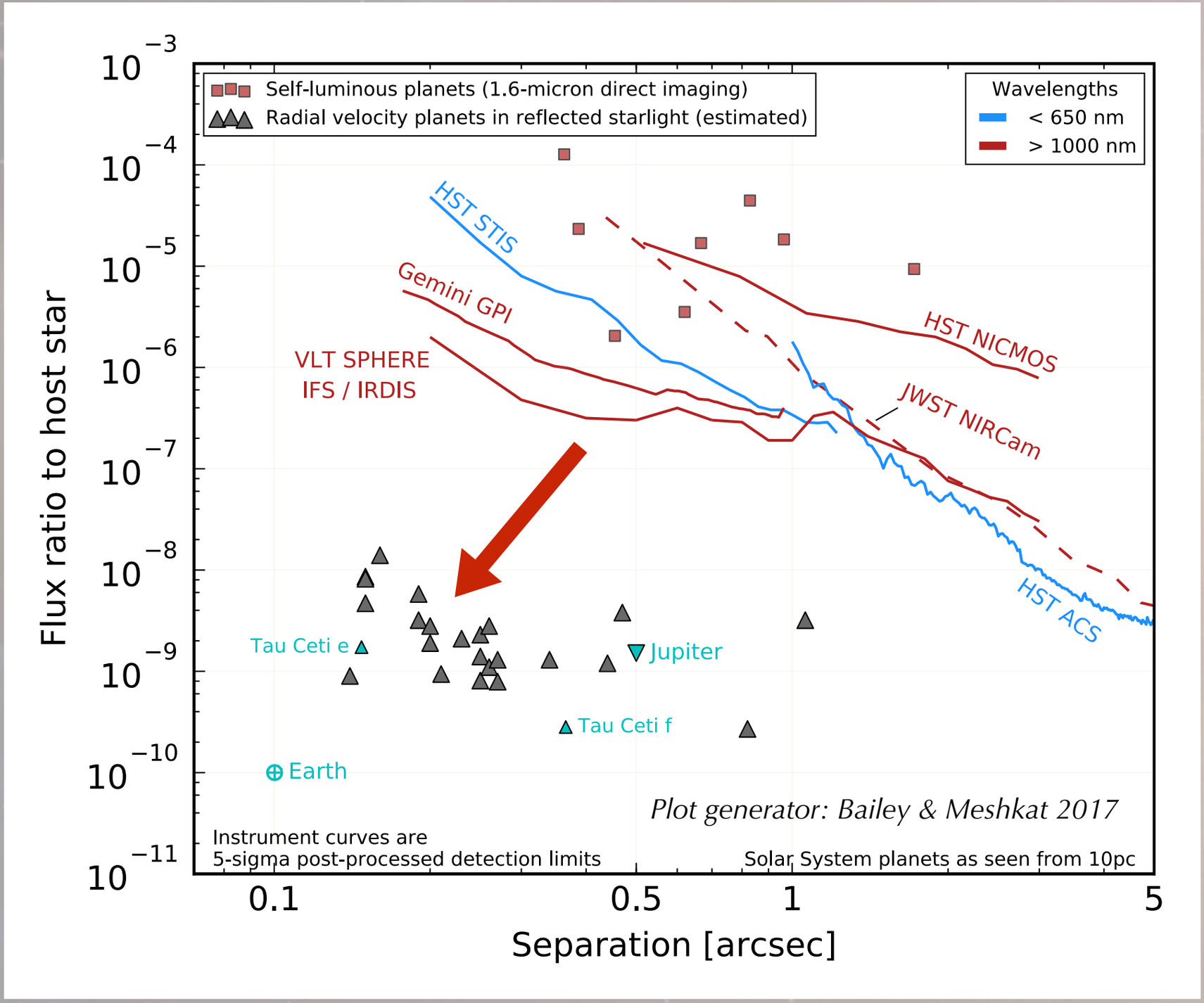

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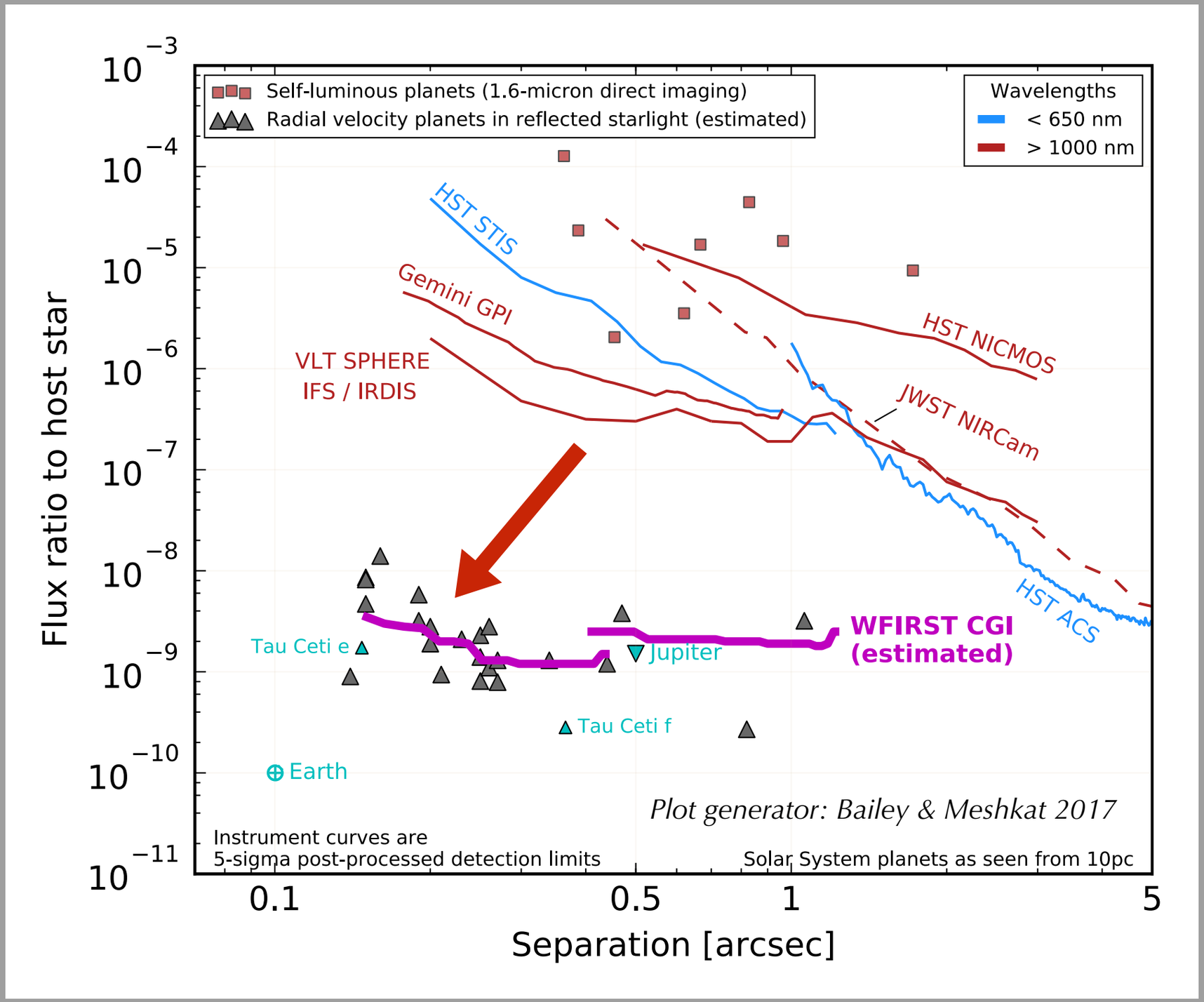

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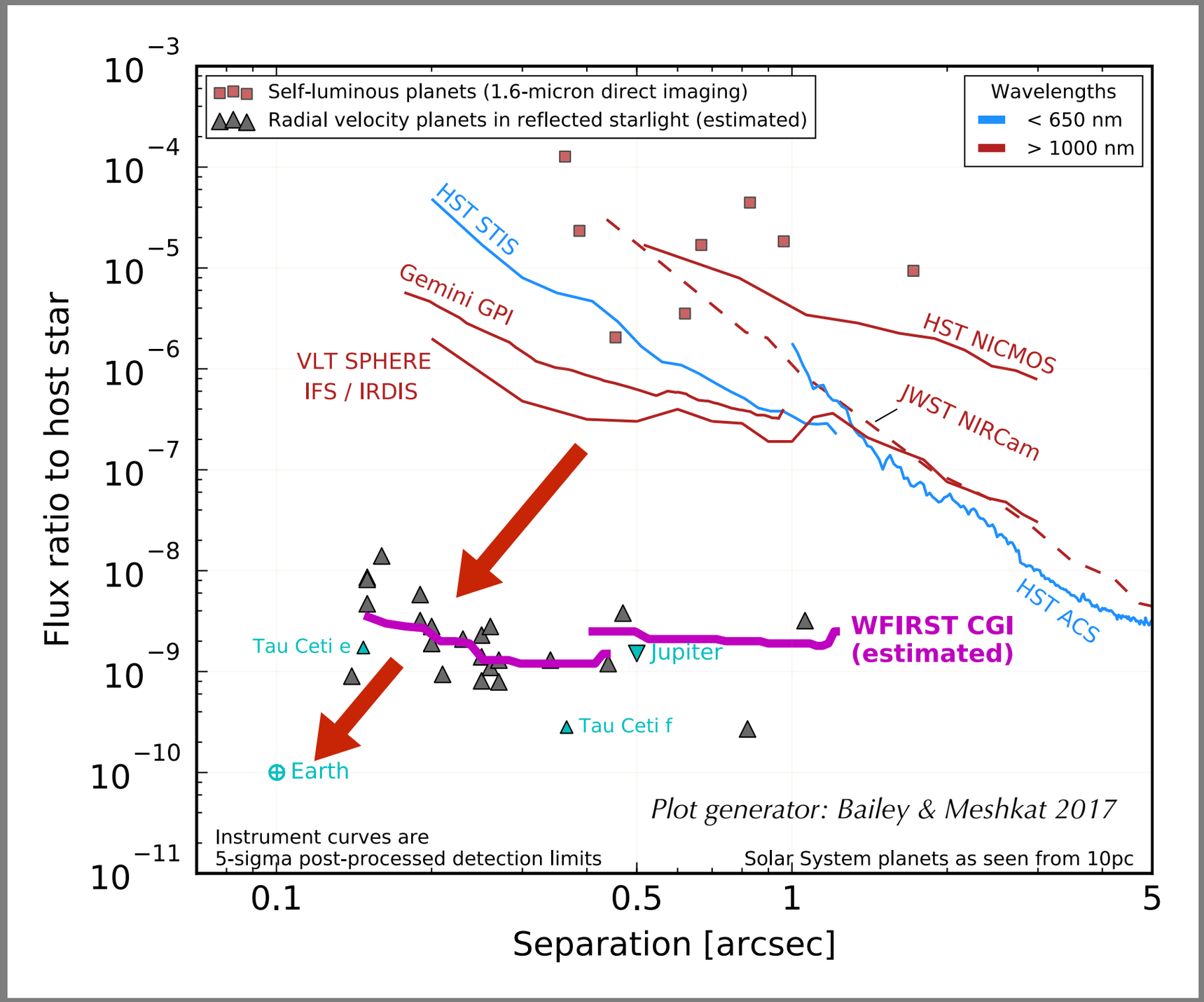
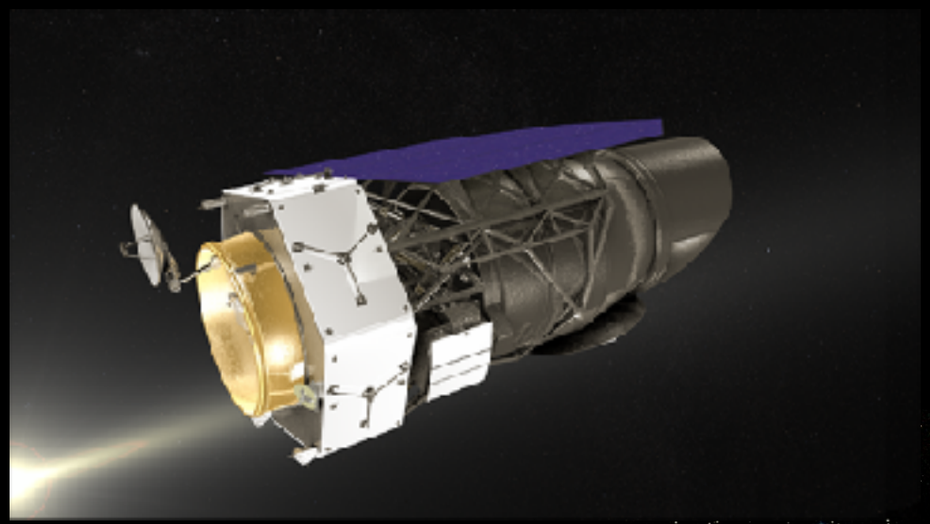
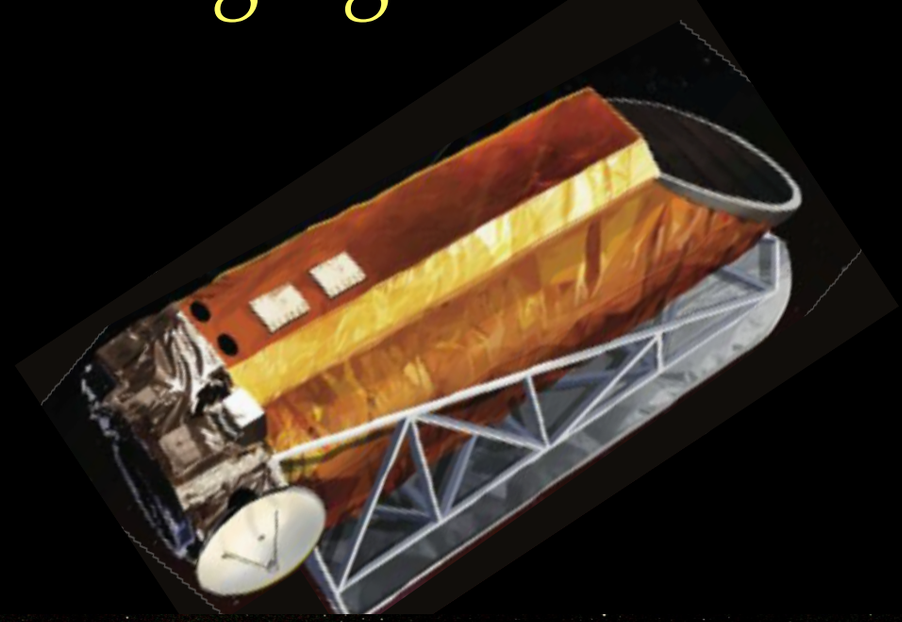
WFIRST CGI advances key technologies for the next generation of Exo-Earth Missions



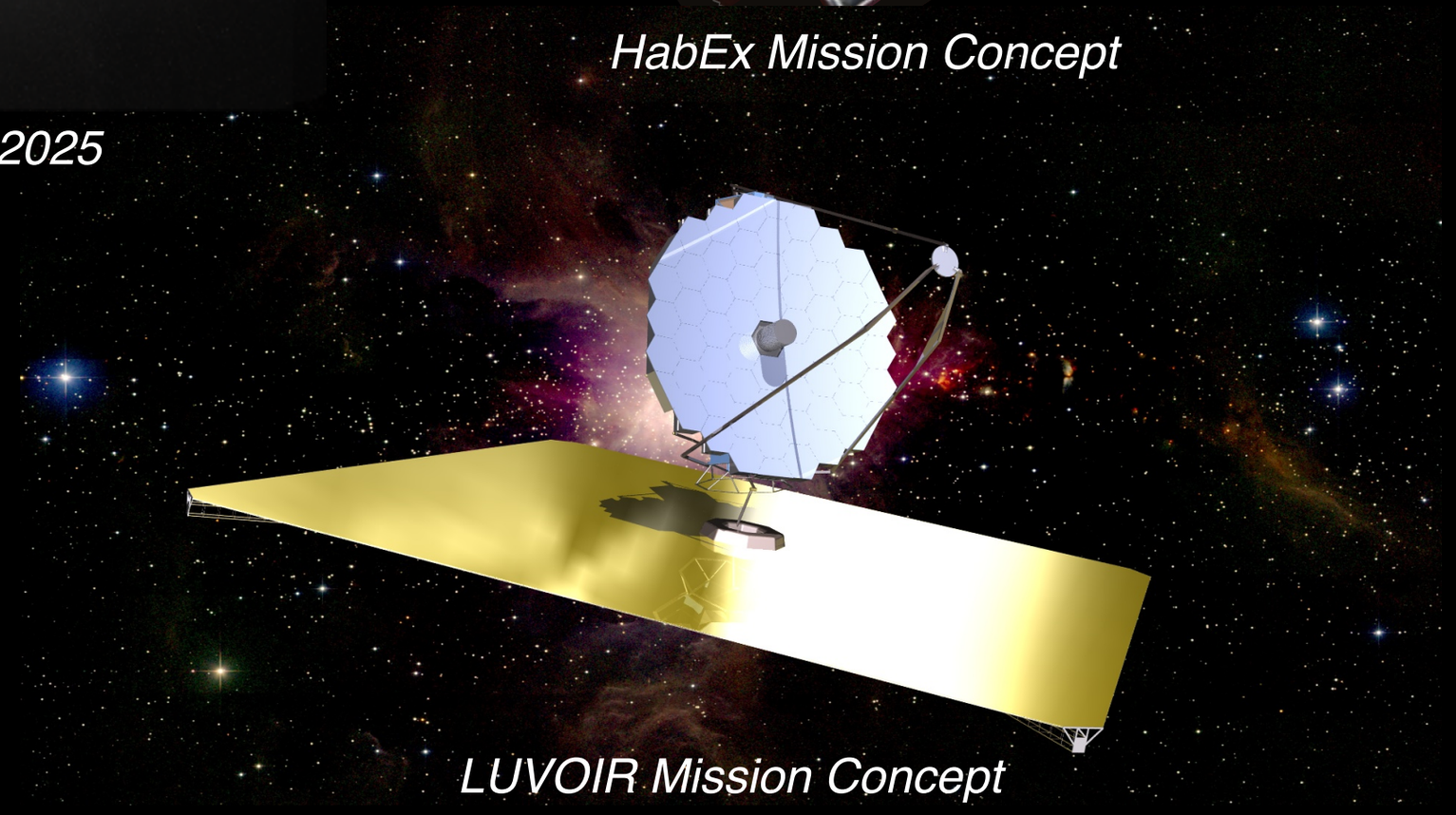
The WFIRST Coronagraph Instrument is a pathfinder for a future exo-Earth imaging mission



WFIRST - CGI - 2025



HabEx Mission Concept



LUVOIR Mission Concept